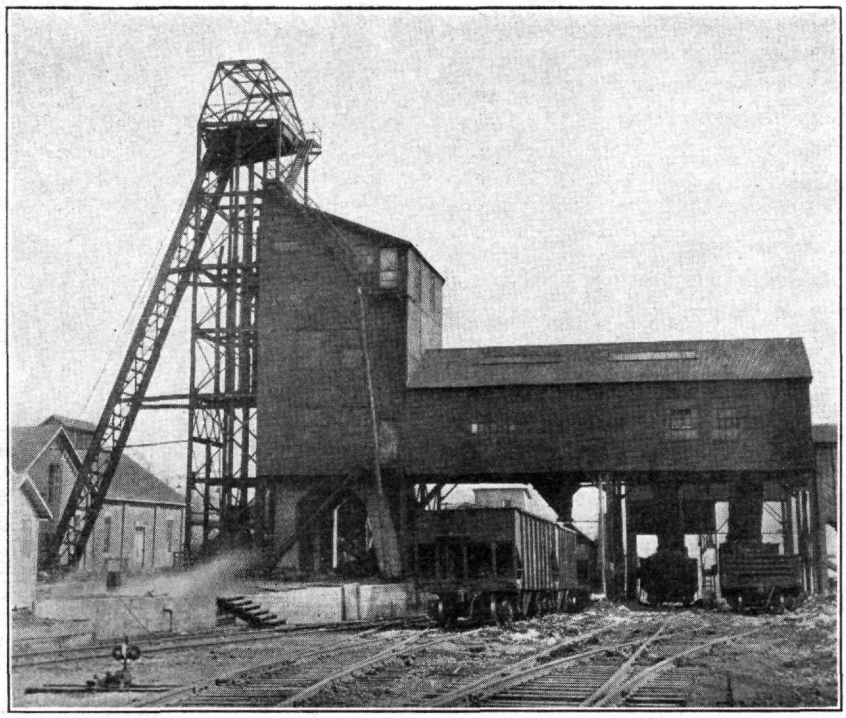
The Iron Monitors

By Dent Brown

IF an Ohioan travels through the coal producing regions of West Virginia and Kentucky his first impression will probably be that of a loss of freedom caused by the oppressiveness of rising mountain slopes, which always hem one in on all sides; the next thing to draw his attention will be the tipples of numerous collieries.

Here to the left is a tipple snuggled closely against the foot of a mountain. Far above and directly in line with the tipple is a towerlike structure projecting from the mountain side. On closer observation it is discovered that this building, the "head house," is small when compared to its massive supporting beams and struts, which are spread apart like the legs of a giant trying to obtain foothold so that he might not be suddenly pulled forward and tumble to his destruction in the valley below.



—Courtesy Experiment Station.

A Coal Tipple

And indeed this is just what might happen to the head house. For two ponderous go-carts made of hollow iron boiler shells are continually jerking and tugging at its internal parts by means of a strong steel cable. This wire cable is run through a system of pulley wheels anchored in the foundations of the head house. Since each monitor is fastened to an end of the rope the arrangement is made that when one monitor is let down from the top it pulls the other up from the bottom.

These monitors run on a steep inclined slope having a narrow gauge track for a road bed. The track has only three parallel rails, the inside wheels of both monitors using the middle rail. In order to avoid collision there are two V switches, located half way down the slope, which divide the three rail system into two complete sets of track that spread apart allowing a clearance between and rejoining about seventy feet farther on. Since the monitors always pass at this point the expense of two complete track ways up the mountain is eliminated.

The purpose of these monitors is to send coal from the coal seam, which nature has placed near the top of the mountain, to the loading tipple in the river valley below.

The operating principle is very simple and effective. The monitors run alternately up and down the slope which lies at an angle of nearly fifty degrees. The upper monitor is filled with about eight tons of coal; the equilibrium between the two now being destroyed, the loaded monitor runs down its track simultaneously pulling the lighter one up. When it reaches the bottom and runs into the tippel chute, an automatic latch opens the door at its lower end, allows the cargo to be vomited forth in a suffocating cloud of "bug dust." The other monitor is now at the top of the mountain and the process will be repeated.

The head house serves two main functions: First, that of loading the monitors; second, that of keeping them under control.

The coal is hauled out of the mine in small flat shallow cars; these cars are switched into a dump located in the head house and emptied one at a time, the contents falling into a short chute that leads to the monitor landing. At the end of this chute is a heavy sliding iron gate by means of which about eight tons of coal are allowed to run into the monitor. The action of the monitors is controlled by the pulley wheels, technically known as "sheave wheels"; these are arranged in sets of two. Each wheel has fixe grooves cut in its surface; each is set

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on a horizontal plane at a distance of about five feet from the other's rim; the larger is about twelve feet in diameter, the smaller nine. The wire cable is threaded about these two wheels in such a manner as to give five half turns about each wheel; at the end of each half turn the cable passes to the other wheel at an internal tangent. This system of threading the sheaves supplies sufficient friction to keep the cable from slipping through them when the brakes are suddenly applied.

Fastened to each of the sheaves is a massive brake drum. If these brakes should fail to function or if the rope should happen to slip in the sheaves, the monitors would run wild and instead of stopping at end of their trip would crash headlong through both the tipple and head house, leaving total wreckage in their wake.

One man called the "drum runner" has complete control of both the loading and brake drum systems; he is stationed in the very top part of the head house where from two windows he has a complete view of everything taking place. By an ingenious system of levers all controls are centralized near the window so the drum runner is never required to leave his post of duty.

Many other methods have been devised to send coal down the mountains. Some may be used where monitors are impractical; for example, when the loading tipple is on the opposite side of the river from the mines, two heavy wire cables are suspended across the chasm and trolly buckets run back and forth on these cables. But few of the systems are as effective and simple as the typical monitor line.

—Courtesy Experiment Station.

A Loading Boom